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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,215	02/10/2005	Yasuhiko Kojima	265769US26PCT	6423
22850	7590	12/03/2008	EXAMINER	
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			CHEN, KEATH T	
			ART UNIT	PAPER NUMBER
			1792	
			NOTIFICATION DATE	DELIVERY MODE
			12/03/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/524,215	<b>Applicant(s)</b> KOJIMA ET AL.	
	<b>Examiner</b> KEATH T. CHEN	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-10,12-14,17 and 19 is/are pending in the application.
- 4a) Of the above claim(s) 6-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 5, 12-14, 17, and 19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. The claim amendment filed on 11/06/2008, addressing claims 1, 2, 4-50, 12-17, 19, and 20 rejection from the non-final office action (08/06/2008) by amending claim 1, 13 and 17 and canceling claims 15, 16, and 20 is entered and will be addressed below.

### ***Election/Restrictions***

2. Claims 6-10 remain withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Invention II, there being no allowable generic or linking claim.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**3. Claims 1, 4, 13, 14, 17, and 19 are rejected under USC 103 (a) as being unpatentable over Kazama et al. (US 5567267, hereafter '267), in view of Joshi (US 5482919, hereafter '919).**

'267 teaches some limitations of:

Claim 1: A substrate processing apparatus (Fig. 1) comprising: a processing chamber (#3, col. 3, lines 66-67) for accommodating a substrate (W, col. 3, line 66) therein; a mounting table (susceptor #4a and heater fixing frame #4b, col. 4, line 44) for mounting the substrate thereon; a heating member (#19, col. 5, line 24) disposed in the mounting table (#4a-b), for heating the substrate; a sealing member (O-ring #38, col. 6, line 56) disposed between a bottom of a support of the mounting table (#4a-b) and a

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bottom portion of the processing chamber (#2d, col. 4, line 5) ; a cooling unit (refrigerant reservoir #27, and associated refrigerant supply means, col. 5, line 64 to col. 6, line 6), having a cooling medium (#26, col. 5, line 64), for cooling the sealing member (#38) by using a latent heat of vaporization of the cooling medium (nuclear boiling is latent heat, col. 6, line 2) included therein, wherein the cooling unit includes an airtight casing (main body #41, shown in Fig. 12, in #4c is air-tight, col. 6, line 8; the pipe #28 is intrinsically air-tight too) for accommodating the cooling medium (#26) therein, the casing has a first end portion (main body #41 in #4c) and a second end portion (pipe leading to valve #29), and the first end portion is inserted into an opening formed through the bottom portion of the processing chamber (as shown in Fig. 1), the first end portion being disposed below the sealing member (main body #41 top end is below #37 and #38), and the second end portion being disposed outside the processing chamber (pipe #28 end at #29 outside the chamber bottom #2d); a temperature sensor (#23, col. 5, line 38) inserted into an aperture; and a cooling unit controller (CPU #40, col. 6, lines 38-40) for controlling flow rates of a coolant based on a measurement result of the temperature sensor.

'267 teaches the temperature sensor (#23 col. 5, lines 45-48) can be arranged at any positions in the mount #4 (including the top portion of #4c).

'267 does not explicitly teaches other limitations of:

Claim 1: (a temperature sensor inserted into an aperture) formed through the bottom portion of the processing chamber, wherein the temperature sensor is disposed

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between the sealing member and the first end portion of the casing of the cooling unit;  
wherein the cooling unit further includes a condenser accommodating therein the  
second end portion to thereby liquefy, in the second end portion, the cooling medium  
vaporized in the first end portion, the condenser includes a vessel for accommodating  
therein the second end portion, and a circulation line for circulating the coolant which  
liquefies the vaporized cooling medium in the second end portion is connected to the  
vessel and a coolant supply source.

'919 is an analogous art in the field of cooling (abstract), particularly in heat pipe.  
'919 teaches heat pipe (#80, Fig. 1 and 6, col. 6, line 6) in multi-stage (col. 2, lines 20-  
21) cooling device (Fig. 1, for example).

At the time the invention was made, it would have been obvious to a person of  
ordinary skill in the art to have replaced the cooling unit (#27) of '267 with the multi-  
stage cooling device, as taught by '919, by inserting heat pipe (#80) in place of pipe  
(#28) of '267 and adding a condenser include a vessel (as shown in Fig 1 of '919) to  
accommodating the cold/second end of the heat pipe, and a circulation line (#32 and  
#34) for circulating the coolant which liquefies the vaporized cooling medium in the  
second/cold end portion (col. 6, lines 28-32) is connected to the vessel and a coolant  
supply source (as shown in Fig. 1 of '919). Furthermore, to have placed the sensor at  
the top portion of the cooling block (#4c) and to have inserted the temperature sensor  
(#23) from the bottom of the chamber.

The motivation to replace the cooling unit with multi-stage cooling device for the purpose of reducing temperature gradient (col. 3, lines 9-11). The motivation to place the temperature sensor at cooling block (#4c) is to detect temperature characteristic in the mount (#4), as taught by '267 (col. 5, lines 46-49). The motivation to insert the temperature sensor from the bottom of the chamber is an obvious re-arrangement of parts.

'267 and '919, together, disclose the claimed invention except for insertion point of the temperature sensor. It would have been an obvious matter of design choice to arrange the temperature sensor from the bottom of the chamber to detect the temperature of the mount (#4) at the bottom of the chamber, since it has been held that rearranging parts of an invention only involves routine skill in the art. *In re Japikse*, 86 USPQ 70.

'267 further teaches the limitations of:

Claim 4: The apparatus of claim 1, further comprising a processing gas supply system (#5a-c, col. 4, lines 7-9) for supplying a processing gas into the processing chamber.

Claim 19: The apparatus of claim 1, further comprising a power supply (#20, heater driver, col. 5, line 30, with a power supply to heater, col. 10, line 49), disposed outside the chamber (as shown in Fig. 1), for supplying a power to the heating member, the heating member being connected to the power supply via lead lines (as shown in

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Fig. 1); wherein the substrate is processed by using a processing gas (from #5b, col. 4, line 8) supplied into the processing chamber (#3), and the sealing member prevents the lead lines from contacting with the processing gas (obvious to re-arranged the heater power feed line from bottom of the chamber, as discussed above, therefore the seal protected the lead lines).

'919 further teaches the limitations of:

Claim 13: The apparatus of claim 1, wherein the casing (#80 and its tube #82 is casing, col. 6, lines 19-22) includes a wick (#84, col. 6, line 23) for moving the cooling medium liquefied in the second end portion to the first end portion by a capillary force (col. 6, lines 28-32 and line 35).

Claim 14: The apparatus of claim 13, wherein the wick is a wire net (woven metallic mesh, col. 6, lines 26-27 and as shown in Fig. 6).

Claim 17: The apparatus of claim 1, wherein a pump (compressor #30, col. 3, line 66) for pumping the coolant from the coolant supply source is installed on the circulation line (#32 and #34, col. 3, line 64 to col. 4, line 3).

**4. Claims 2 and 12 are rejected under USC 103 (a) as being unpatentable over '267 and '919, in view of Fukatami et al. (US 6298909, hereafter '909).**

'267 and '919, together, teaches all limitations of claim 1, as discussed above.

'267 and '919, together, do not teach the limitations of:

Claim 2: The apparatus of claim 1, wherein the casing is depressurized.

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Claim 12: The apparatus of claim 1, wherein the cooling medium is water, hydrofluoroether, alcohol, fluorine-contained inactive liquid or naphthalene.

'909 is an analogous art in the field of heat transfer (abstract) and cooling (col. 1, lines 14-15). '909 teaches a heat pipe under low pressure and using water, alcohol, and fluorocarbon as working fluid/medium (col. 5, lines 38-42).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have replaced the working fluid/medium of '919 with a low pressure water, alcohol, or fluorocarbon, as taught by '909 (col. 5, lines 38-42).

The motivation to replace the working fluid is suitability. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. MPEP 2144.07.

**5. Claim 5 is rejected under USC 103 (a) as being unpatentable over '267 and '919, in view of Otsuki (US 2001/0003271, hereafter '271).**

'267 and '919, together, teaches all limitations of claim 4, as discussed above.

'267 and '919, together, do not teach the limitations of:

Claim 5: The apparatus of claim 4, wherein the processing gas supply system includes a plurality of processing gas supply units for supplying different processing gases and a processing gas supply unit controller for controlling each of the processing



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gas supply units such that the processing gases are supplied alternately.

'271 is an analogous art in the field of CVD for semiconductors (abstract and [0002]). '271 teaches the use of a plurality gas supplies (items 41-45 in Fig. 1 and [0051]) and gas supply controllers (mass flow controllers, items 52 in Fig 1 and [0051]) for supplying discharge gases alternately ([0049]).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have added a plurality gas supplies and controllers, as taught by '271, to the apparatus in Fig. 1 of '267 in combination with '919.

The motivation to add a plurality of gas supplies and controller is to alternate discharge reactant gases ([0049]).

### ***Response to Arguments***

Applicant's arguments filed 11/06/2008 have been fully considered but they are not persuasive.

In regarding to 35 USC 112 rejection of claim 1, Applicants' amendment of claim 1 overcomes the rejection.

Applicant's arguments with respect to 103(a) rejection of various claims have been considered but are unconvincing in view of the new ground(s) of rejection.

### ***Conclusion***

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Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEATH T. CHEN whose telephone number is (571)270-1870. The examiner can normally be reached on 6:30-3.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. T. C./  
Examiner, Art Unit 1792

/Ram N Kackar/

Primary Examiner, Art Unit 1792